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## Intensive Archeological Survey: State Highway 159 at East Mill Creek, Austin County, Texas

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## Intensive Archeological Survey: State Highway 159 at East Mill Creek, Austin County, Texas

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# Report for Archeological Survey

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Intensive Archeological Survey:  
State Highway 159 at East Mill Creek,  
Austin County, Texas

## Yoakum District

Allen Bettis, Principal Investigator, Antiquities Permit No. 8204

CSJ: 0408-02-046

December 14, 2017

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated 12-16-14, and executed by FHWA and TxDOT.

## Abstract

On behalf of the Texas Department of Transportation (TxDOT), SWCA Environmental Consultants (SWCA) conducted an intensive cultural resources survey on December 1, 2017, of 13.27 acres (5.37 hectares) of existing right-of-way (ROW) along State Highway (SH) 159 at the East Mill Creek bridge proposed for replacement located west of Bellville in Austin County, Texas. As the project will receive funding from the Federal Highways Administration, it qualifies as an undertaking as defined in Title 36 Code of Federal Regulations (CFR) Part 800.16(y); therefore, the archeological survey was conducted in compliance with Section 106 of the National Historic Preservation Act (54 U.S. Code 306108). Furthermore, the project must also comply with the Antiquities Code of Texas (9 Natural Resources Code 191). Allen Bettis served as Principal Investigator under Texas Antiquities Permit No. 8204.

The APE is defined as the existing SH 159 TxDOT ROW between 110 to 170 feet (33.5 to 51.8 meters [m]) wide beginning approximately 522.10 feet (159.14 m) west of the current bridge at East Mill Creek and extending 3,400.00 feet (1,036.32 m) due east. Depth of construction impacts are typically 2 feet (0.61 m), with a maximum of 54 feet (16.46 m). The APE consists of approximately 13.27 acres (5.37 hectares).

Background research identified no previous cultural resources investigations, archeological sites, cemeteries, National Register of Historic Places districts or properties, or historical markers within 0.6 mile (1 kilometer [km]) of the proposed project APE. No potentially historic structures were identified during the historic map review within the APE, with the possible exception of one along the eastern margin of the project area.

The existing ROW has been modified by the construction of Farm-to-Market Road 159 and the current concrete span bridge; existing overhead and buried utilities; and intersecting roadways, ditches, and driveways. At the time of field investigations, active TxDOT construction activities were underway along the entire northern existing ROW. The East Mill Creek floodplain is frequently flooded and large areas were inundated during the investigations, precluding backhoe trenching.

The field investigation consisted of a pedestrian survey of the entire APE augmented with three shovel tests along adjacent terraces and four backhoe trenches within the floodplain of East Mill Creek. The pedestrian survey along with shovel tests and backhoe trenches identified no cultural materials or features within the project APE. The cumulative impacts from the roadway and existing utilities as well as frequent inundation indicate a negligible potential for intact archeological resources within the APE.

SWCA made a reasonable and good faith effort as per 36 CFR Part 800.4(b)(1) to identify and locate prehistoric and historic archeological properties within the proposed project APE. The field investigation discovered no cultural resources; therefore, SWCA recommends that a finding of “no historic properties affected” be made for the current undertaking.

## Project Identification

**Date:** December 14, 2017

**Date(s) of Survey:** December 1, 2017

**Archeological Survey Type:** Reconnaissance ☐ Intensive ☒

**Report Version:** Draft ☐ Final ☒

**Jurisdiction:** Federal ☒ State ☒

**Texas Antiquities Permit Number:** 8204

**District:** Yoakum

**County or Counties:** Austin

**USGS Quadrangle(s):** Bellville (2996-434)

**Highway:** State Highway (SH) 159 at East Mill Creek

**CSJ:** 0408-02-046

**Report Author(s):** Mercedes C. Cody and Steve Carpenter

**Principal Investigator:** Allen Bettis, Texas Department of Transportation (TxDOT)

## Texas Historical Commission Approval

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Signature

Date

## Project Description

**Project Type:** Bridge replacement with roadway improvements

**Total Project Impact Acreage:** 13.27 acres (5.37 hectares)

**New Right of Way (ROW) Acreage:** 0.0 acres (0 hectares)

**Easement Acreage:** 0 acres

**Area of Pedestrian Survey:** 13.27 acres (5.37 hectares)

### Project Description and Impacts:

The proposed project consists of a bridge replacement along SH 159 at East Mill Creek located approximately 2.85 miles (4.59 kilometers [km]) west of Bellville, Austin County, Texas (Figure 1). This undertaking would replace an existing approximately 760-foot-long (231.65-m) by 30-foot-wide (9.14-m) concrete slab and girder on concrete piling structure with a 795-foot-long (242.31-m) by 46-foot-wide (14.02-m) 12 simple span pre-stressed concrete slab and beam structure. The bridge will have a single 12-foot-wide (3.66-m) travel-lane in each direction and two 10-foot-wide (3.05-m) paved shoulders. The proposed project will also include improving existing approaches, approximately 1,421.62 feet (433.31 meters [m]) to the east and 1,182.38 feet (360.39 m) to the west to accommodate the proposed structure. The existing ROW is between 110 to 170 feet (33.53 to 51.82 m) wide and 13.27 acres (5.37 hectares) in size. No new ROW or temporary construction easements would be acquired for this proposed project.

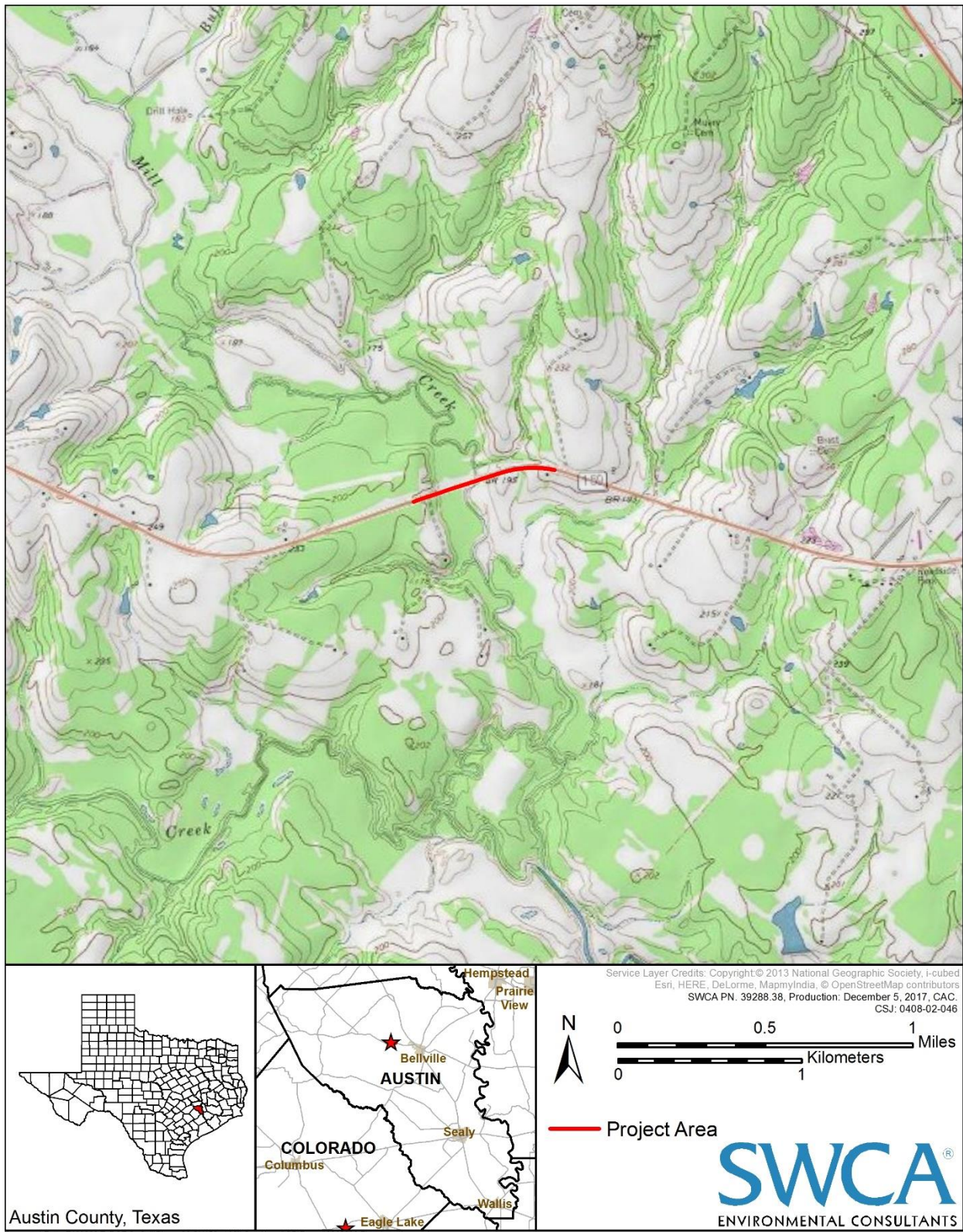
**Area of Potential Effects (APE):** The APE is defined as the existing between 110- to 170-foot-wide (33.53- to 51.82-m) SH 159 ROW beginning 522.10 feet (159.14 m) west of the current bridge at East Mill Creek and extending 3,400.00 feet (1,036.32 m) due east (Figure 2). Depth of construction impacts are typically 2 feet (0.61 m) with a maximum of 54 feet (16.46 m). The APE consists of approximately 13.27 acres (5.37 hectares).

**Project Area Ownership:** The entire ROW is currently owned and managed by TxDOT.

## Project Setting

**Topography:** The APE runs roughly east-west across the floodplain of the East Mill Creek and onto overlooking terraces on both the eastern and western ends. Elevation ranges from a maximum of 200 feet above mean sea level (amsl) at the eastern and western ends of the APE to a low of approximately 170 to 180 feet amsl in the creek floodplain.





**Figure 1.** Project location map.



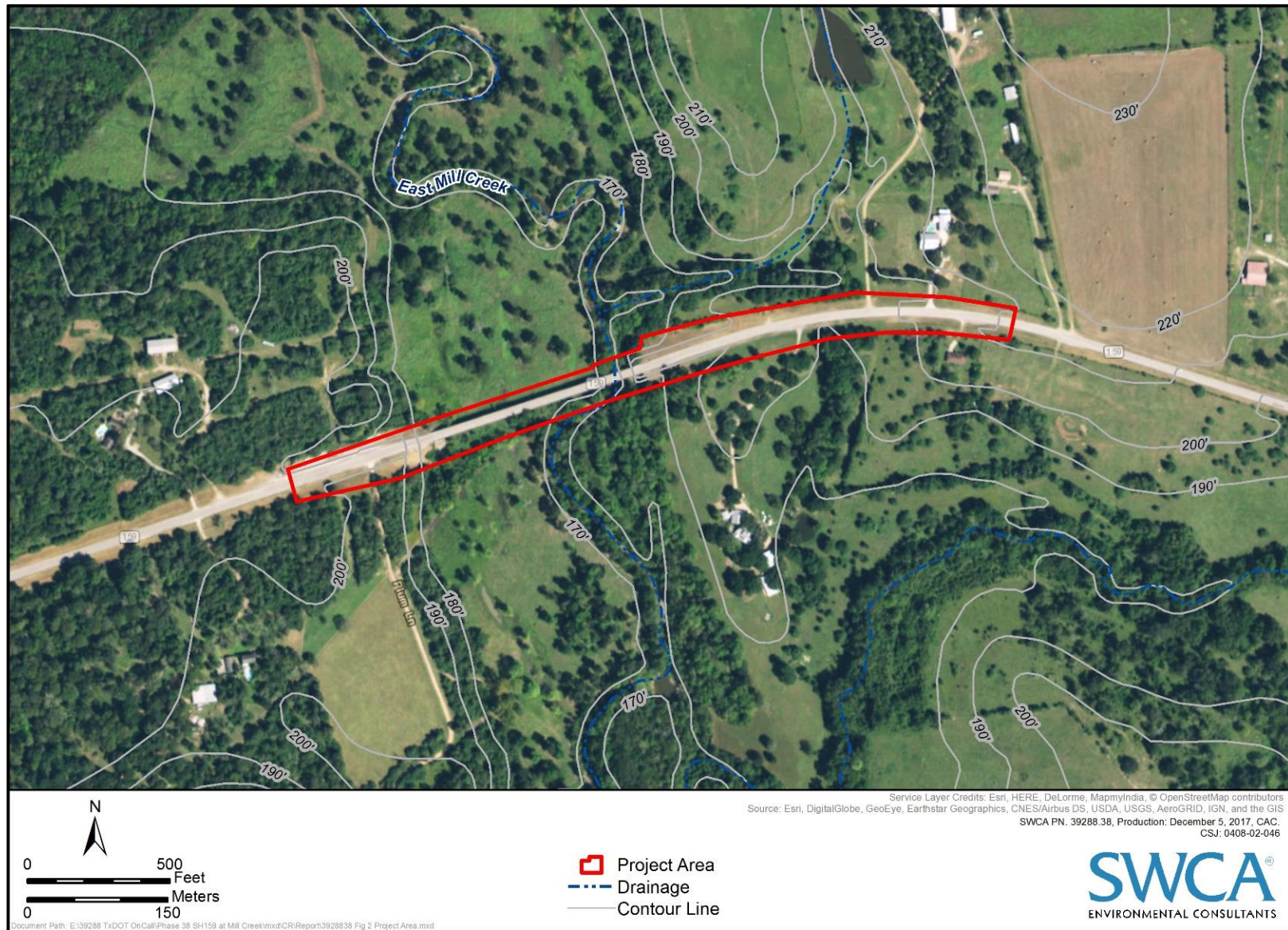


Figure 2. Project area.



**Geology:** According to the Geologic Atlas of Texas, the underlying geology throughout the project area consists of Pleistocene-age fluvial terrace deposits (Qt) within the eastern roughly two thirds and Miocene-age Fleming formation (Mf) within the western roughly one third of the APE (Figure 3) (Barnes 1974). The Pleistocene-age fluvial terrace deposits occur along terraces of streams and consist of sand, silt, clay and gravel in various proportions with gravel more prominent in the older, higher terraces (Barnes 1974). The Fleming formation consists of clay and sandstone typically 1,200 feet (366 m) thick (Barnes 1974).

**Soils:** The U.S. Department of Agriculture – Natural Resources Conservation Service (NRCS) Web Soil Survey, indicates that the APE is mapped within the Trinity clay, frequently flooded; Eufaula fine sand, 0 to 5 percent slopes; Frelsburg clay, 5 to 8 percent slopes; Silawa loamy fine sand, 1 to 5 percent slopes; and Crockett fine sandy loam, 1 to 5 percent slopes detailed soil map units in order of prevalence (Figure 4). The Trinity series consists of occasionally flooded very deep soils that formed in calcareous clayey alluvium derived from mudstone found on floodplains or river valleys and dissected plains (NRCS 2017). The Eufala series consists of very deep soils that formed in sandy sediments of Pleistocene age situated on stabilized dunes on reworked stream terraces in the Northern Cross Timbers (NRCS 2017).

**Land Use:** The existing SH 159 ROW contains the roadway, current concrete span bridge, existing overhead and buried utilities, intersecting roadways, ditches, and driveways; sand and gravel fill is present within the ROW and where the bridge support structures are situated. Existing utilities include a buried AT&T cable on both the northern and southern sides of the roadway that join along the western southern ROW of the bridge just before crossing the creek and splits again on the eastern ROW of the bridge. Beyond the APE, land use patterns consist of open ranchland with scattered residences.

**Vegetation:** The existing ROW consists of sparse short grasses with mixed hardwoods bordering the roadway, and more densely forested vegetation within the floodplain under the bridge particularly within the southern ROW.

**Estimated Ground Surface Visibility:** 0 to 100 percent, not including the existing roadway.

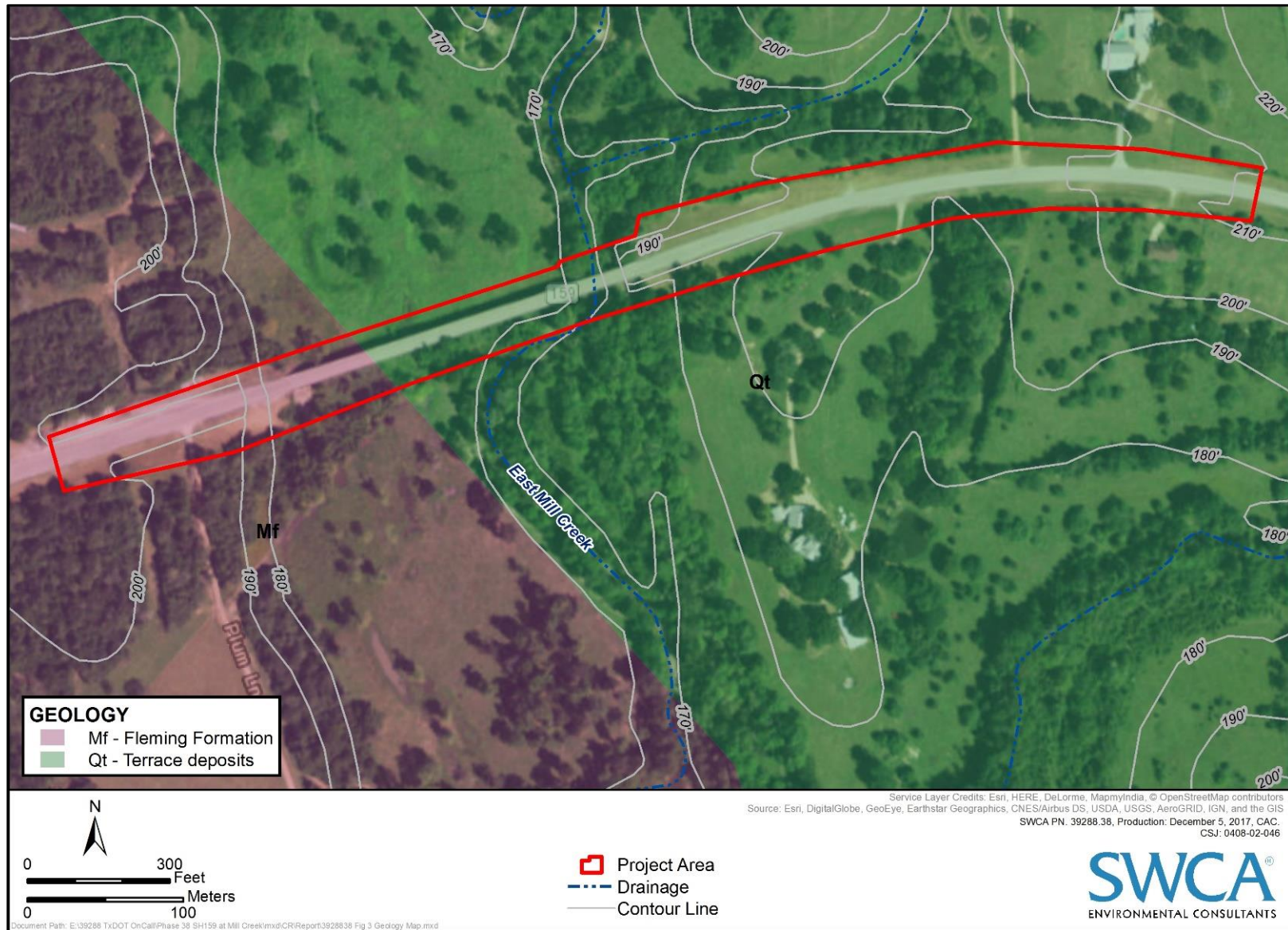


Figure 3. Geology mapped within the APE.



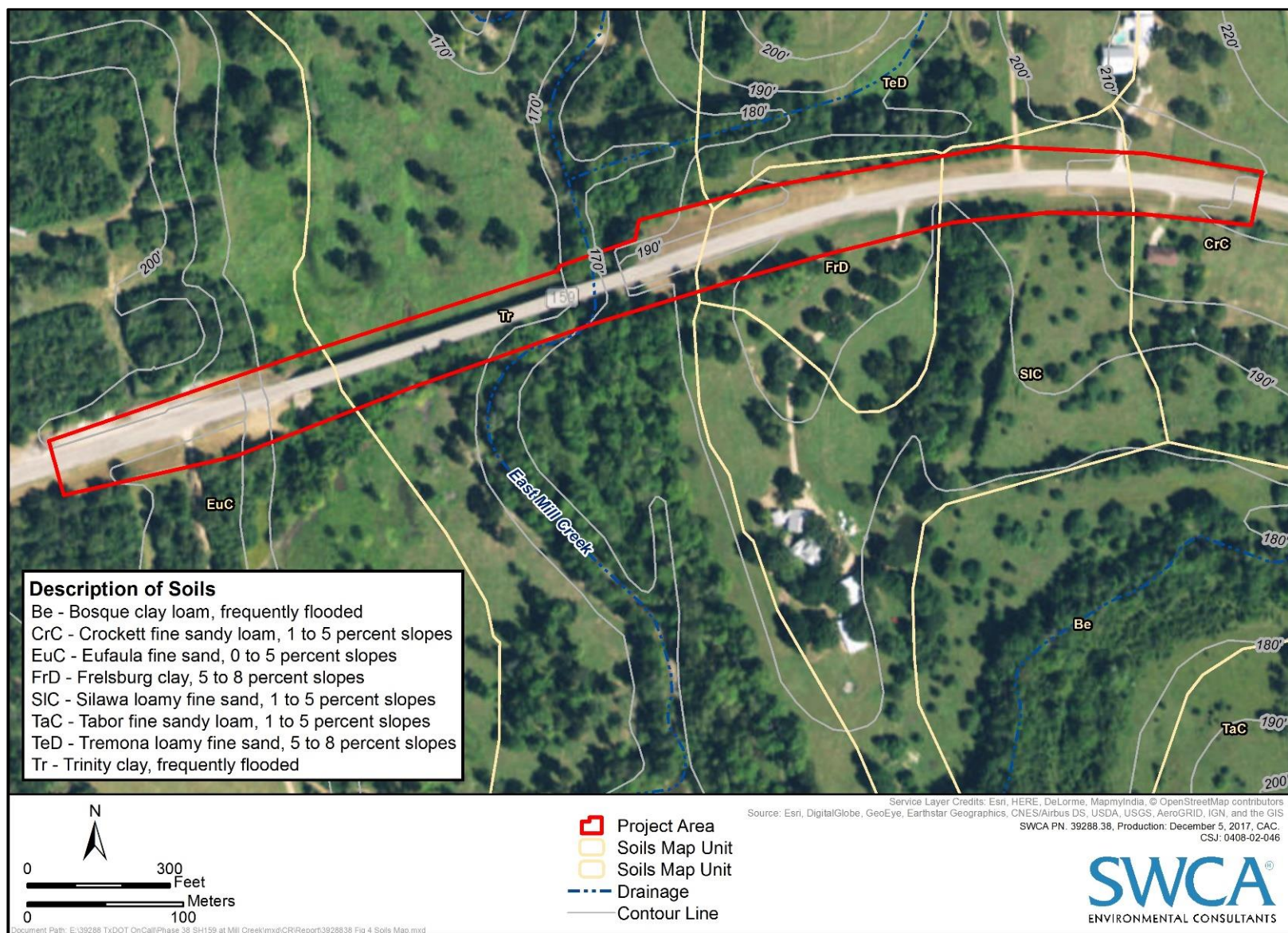


Figure 4. Soils mapped within the APE.

**Previous Investigations and Known Archeological Sites:** SWCA Environmental Consultants (SWCA) conducted a cultural resources background and historic map review of the project area on November 16, 2017. To conduct the background review, an SWCA archeologist reviewed the Bellville (2996-434) U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle map and records pertaining to the project area on the Texas Historical Commission's (THC's) Archeological Sites Atlas online database (Atlas) (THC 2017a). These sources provided information on the nature and location of previously conducted cultural resources investigations, previously recorded prehistoric and/or historic archeological sites, National Register of Historic Places districts and properties, State Antiquities Landmarks, Official Texas Historical Markers, Registered Texas Historic Landmarks, cemeteries, and local neighborhood surveys in, or within 0.6 mile (1 km) of, the proposed project APE. None of the above were identified within 0.6 mile (1 km) of the proposed project APE (THC 2017a).

To perform the historic map review, SWCA reviewed maps contained in the TxDOT Historic Overlay Maps, a mapping/geographic information system (GIS) database with historic maps and resource information covering most portions of the state (Foster et al. 2006). SWCA also reviewed historical USGS topographic maps available on USGS TopoView (USGS 2017). These sources contain information on potential historic resources. The historic map review did not reveal any potentially historic structures within the APE with the possible exception of one along the eastern margin of the project area.

**Comments on Project Setting:** None

## **Survey Methods**

**Surveyors:** Mercedes C. Cody and Mike Golden

**Methodological Description:** The field investigations complied with the THC Archeological Field Survey Standards (THC 2017b). The investigations entailed an intensive pedestrian survey of 13.27 acres, augmented with shovel testing and backhoe trenching in locations that appeared most favorable to contain intact cultural resources (e.g., areas with less visible disturbance or fewer utilities and were not inundated). Trench locations were chosen at the discretion of the project archeologist and focused on areas with the least disturbance within the APE, as well as areas with alluvial deposits and the potential for deeply buried cultural materials. Survey efforts resulted in the excavation of three shovel tests (STs) and four backhoe trenches (BHTs) (Table 1).



**Table 1.** Excavations in Project APE

Method	Quantity in Existing ROW	Quantity in Proposed New ROW	Quantity in Temporary Easements	Total Number per Acre
Shovel Test Units	3	0	0	0.22
Auger Test Units	0	0	0	0
Mechanical Trenching	4	0	0	.55

The SWCA archeologist excavated four BHTs within the existing ROW along SH 159 within the floodplain of East Mill Creek. The archeologist thoroughly documented and photographed the entire excavation process. Additionally, the archeologist recorded ST and BHT locations with a handheld GPS device. Upon completion of the individual tests and trenches, all STs and BHTs were backfilled, levelled, and returned as much as possible to their original state. SWCA performed all work in accordance with Occupational Safety and Health Administration regulations (29 Code of Federal Regulations [CFR] 1926).

**Other Methods:** None

**Collection and Curation:** NO ☒ YES ☐ If yes, specify facility.

**Comments on Methods:** THC survey standards for a project of this size (i.e., >11–100 acres) require a minimum of one shovel test per every 2 acres, or seven tests for a project of this size. THC archeological survey standards do not specify a density of BHTs per unit area (THC 2017b). Due to the existing roadway and heavy disturbance within the APE, the four BHTs and three STs meet the required standards (see Table 1).

## Survey Results

### Project Area Description:

The project area setting is largely undeveloped rural terrain with limited development within an upland and inland dissected coastal plain setting along East Mill Creek. The APE is entirely within existing TxDOT ROW surrounded by open, rolling ranch lands with pastoral fields and sparsely scattered residences. The exception to this is the forested riparian margins along East Mill Creek and its associated tributaries, as well as associated bottomlands. Development in the area includes the SH 159 roadway through semi-open ranchland.

SWCA archeologists conducted an intensive pedestrian survey supplemented with the excavation of STs and BHTs across the entire APE (Figure 5). The existing ROW has been heavily modified by the construction of Farm-to-Market Road 159 and the current concrete span bridge; existing overhead and buried utilities; and intersecting roadways, ditches, and

driveways (Figure 6). At the time of field investigations, active TxDOT construction activities were underway along the entire northern existing ROW. The southern existing ROW is heavily disturbed due to existing overhead and buried utilities as well as large areas of fill and ditch. The East Mill Creek floodplain is frequently flooded and large areas were inundated during the investigations, precluding backhoe trenching. The backhoe trenching investigations are further discussed in its respective section further below.

The portion of the existing ROW along the uplands consists of short grasses and is largely devoid of vegetation, particularly along the northern ROW currently under construction, affording abundant ground surface visibility. The portion of the existing ROW along the floodplain contains short grasses within the northern ROW and moderate to dense vegetation within the southern portion and immediately adjacent to the creek (Figure 7).

Surveyors excavated three shovel tests (MCC01, MCC02, and MG01) within the APE in areas that warranted shovel testing and that were not heavily disturbed along the southern ROW in the uplands (Table 2). The shovel tests were all negative for cultural materials and exhibited deep yellowish to reddish brown sand atop sandy loam in the area west of the bridge, and disturbed clay mixed with fill in the area east of the bridge.

The pedestrian survey along with shovel tests and backhoe trenches identified no cultural materials or features within the project APE. Abundant surface exposures along the northern side of the APE yielded no cultural materials. The cumulative impacts from the roadway and existing utilities indicate a negligible potential for intact archeological resources within the APE.

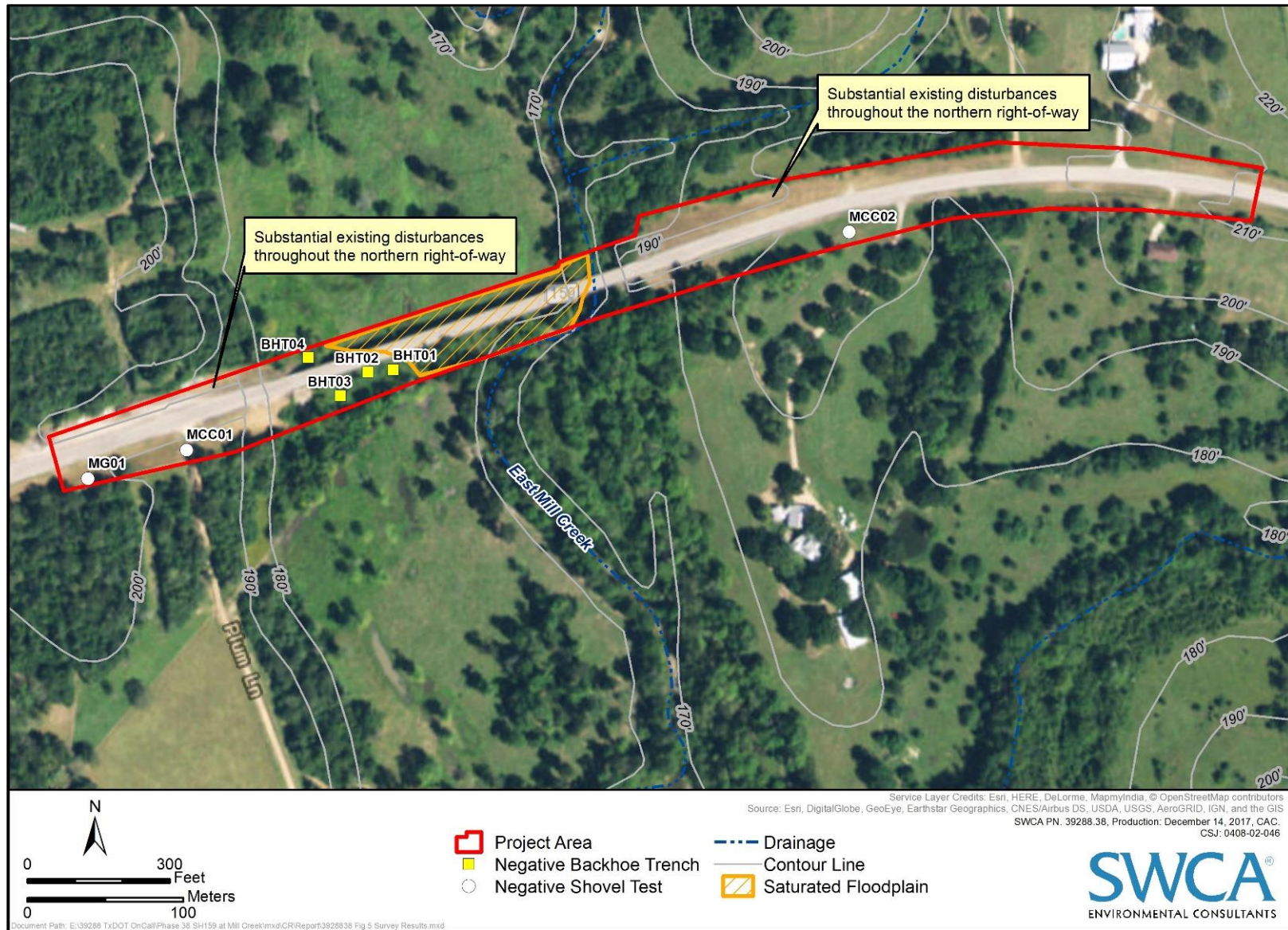


Figure 5. Survey results map.





**Figure 6.** Overview of APE within existing ROW showing disturbances, facing east.



**Figure 7.** Overview of APE along low-lying floodplain of East Mill Creek, facing southeast.



**Table 2. Shovel Test Data**

Shovel Test No.	Site No.	Positive (P)/ Negative (N)	Level	Depth (cmbs)	Munsell	Color	Texture	Inclusions	Comments/ Reason for Termination
MCC01	NA	N	1	0-30	10YR 6/4	light yellowish brown	Sand		No cultural material encountered.
		N	2	30-100	10YR 6/6	brownish yellow	Sandy Loam		No cultural material encountered. Terminated at depth.
MCC02	NA	N	1	0-35	7.5YR 6/6	reddish yellow	Clay	5-10% Gravels, Mottles	No cultural material encountered. Terminated at disturbed clay with white fill gravels and mottles.
MG01	NA	N	1	0-20	7.5YR 5/6	strong brown	Sand	1-5% Gravels	No cultural material encountered.
		N	2	20-40	7.5YR 5/6	strong brown	Sand	1-5% Charred wood fragments	No cultural material encountered.
		N	3	40-60	7.5YR 5/6	strong brown	Sand	1-5% Charred wood fragments	No cultural material encountered.
		N	4	60-80	7.5YR 6/8	reddish yellow	Sandy Loam	1-5% Pebbles	No cultural material encountered.
		N	5	80-100	7.5YR 6/8	reddish yellow	Sandy Loam	1-5% Pebbles	No cultural material encountered. Terminated at depth.

## Backhoe Trenching

The portion of the APE slated for mechanical excavations was within the floodplain of East Mill Creek under the bridge (see Figure 5). The area is moderately to densely vegetated. SWCA excavated four BHTs (BHTs 1–4) within the project APE (Table 3). The East Mill Creek floodplain is frequently flooded and large areas were inundated during the investigations, precluding further backhoe trenching. The natural landform is a wide T<sub>0</sub> terrace and likely constitutes a forested wetland with long-term water saturation.

SWCA excavated four BHTs within the project APE. Additional trenches were originally planned, but ground conditions along East Mill Creek precluded access due to existing bridge pillars and wetland areas, on both the northern and southern sides of the roadway (Figure 8). Three trenches (BHTs 1, 2, and 3) were excavated on the southern side of the APE. BHTs 1 and 2 had similar profiles: very dark gray (10YR3/1) clays with a firm blocky angular structure. Moisture increased with depth, and standing water was commonly observed in the surrounding areas. In BHT 1, well-developed calcium carbonate nodules were identified at approximately 125 centimeters below ground surface (cmbs). The BHT 2 profile was similar but encountered modern debris in the upper 35 cm, and disturbed sediment between 105 and 115 cmbs. BHT 3 consisted of two strata, a grayish brown

(10YR5/2) sandy loam overlying the same very dark gray clays found in the previous trenches

The area on the northern side afforded one spot for a backhoe trench, BHT 4, between the fill section of the bridge and the edge of the ROW. BHT 4 encountered dense rubble from the original construction of the bridge; the trench was excavated to 85 cmbs when the water table was encountered.

In summary, the trenches on the floodplain encountered saturated sediments within a frequently flooded terrain replete with surrounding wetland areas. The trenches encountered thick, massive to blocky angular/subangular, dark gray clays. As indicated by the presence of calcium carbonate development, the bottom dark gray layer is likely a pre-Holocene unit, but saturated sediments precluded deeper excavations.

**Archeological Materials Identified:** During the current investigation, SWCA encountered no cultural resources within the survey area.

**APE Integrity:** The existing SH 159 APE exhibits extensive prior disturbance from road and bridge construction and the installation of overhead and buried utilities, thereby compromising the integrity of the survey area. In addition, the East Mill Creek floodplain is frequently flooded and inundated.



**Figure 8.** Backhoe Trench 4 showing shallow water table in East Mill Creek floodplain.

**Table 2. BHT Excavations in Project APE.**

Trench No.	Depth (cmbs)	Munsell Value	Soil Color	Soil Texture	Consistency	Structure	Grade	Inclusion Type	Lower Boundary	Comments
BHT01	0-160	10YR3/1	Very Dark Gray	Clay	Extra Firm	Massive to Blocky Angular, Subangular	Strong	Roots/Rootlets (10%), Shell Fragments (5%), Calcium Carbonate Nodules (5%) 125+ cmbs	–	Negative for cultural materials. Moist from frequent flooding in surrounding area with moisture increasing with depth.
BHT02	0-160	10YR3/1	Very Dark Gray	Clay	Extra Firm	Massive to Blocky Angular, Subangular	Strong	Roots/Rootlets (10%), Shell Fragments (5%)	–	Negative for cultural materials. Moist from frequent flooding in surrounding area with moisture increasing with depth. Two modern round nails along east wall at 35 cmbs. Disturbed area observed along north margin between 105 and 115 cmbs with 7.5YR5/8 strong brown clay and 10YR8/1 white clay with small gravels and burned wood/root charcoal stains.
BHT03	0-45	10YR5/2	Grayish Brown	Sandy Loam	Friable	Granular	Weak	Roots/Rootlets (10%), Shell Fragments (5%)	Abrupt and Smooth	Negative for cultural materials. Moist from frequent flooding in surrounding area with moisture increasing with depth.
	45–153	10YR3/1	Very Dark Gray	Clay	Extra Firm	Massive to Blocky Angular, Subangular	Strong	Roots/Rootlets (5%), Shell Fragments (5%)	–	Negative for cultural materials. Moist from frequent flooding in surrounding area with moisture increasing with depth.
BHT04	0-85	10YR5/2	Grayish Brown	Sandy Loam	Friable	Granular	Weak	Roots/Rootlets (10%)	–	Negative for cultural materials. Bridge debris (i.e. concrete, rebar, metal) observed throughout. Terminated due to water seeping into trench from flooded surrounding area.

## Recommendations

**Further Work:** No further work is recommended within the APE.

**Justification:** Investigators did not encounter any historic or prehistoric cultural materials during intensive investigations of the APE. Cultural materials (e.g., glass soda and beer bottles, metal fragments, and plastic fragments) were observed on the ground surface within the APE, but all were recent in age. The backhoe trenching across the project encountered shallow sediments, common disturbances, and saturated sediments in the frequently inundated floodplain of East Mill Creek. Wetlands prevented additional trenching nearer the drainage.

Additionally, since the APE consists of entirely existing ROW, the extensive roadway and bridge construction and disturbances throughout the existing ROW has greatly decreased the potential for encountering intact cultural deposits. No further investigations are recommended to assess deep impacts from project construction within the 13.27 acres of existing ROW.

Investigations were conducted in compliance with the Antiquities Code of Texas and Section 106 of the National Historic Preservation Act. As per the federal and state implementing regulations at 36 CFR 800.4(b)(1) and 13 Texas Administrative Code 26, SWCA has made a reasonable and good faith effort to identify all cultural resources within the APE and recommends no further cultural resources investigation prior to construction.



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This report was written on behalf of the Texas Department of Transportation by



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